

## REMARKS

This responds to the Office Action mailed on May 18, 2007.

Claims 1, 3-5, 7, 8 and 23-25 remain pending in this application.

### §112 Rejection of the Claims

Claims 4, 5 and 23-25 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

1. Applicant respectfully disagrees that “the specification does not teach curing the underfill material that is between the die and the mounting substrate.” (Office Action at page 2). The underfill material by definition is between the die and the mounting substrate.

In the specification, it states:

Heating of the package is carried out in a curing oven under conditions to cause the tacky film 130 to release from the flip-chip assembly 110. This heating scheme includes a first temperature ramp from the ambient after underfilling, to a temperature range from about 100° C to about 140° C. Next, a temperature hold is maintained at a temperature in this range. The temperature hold may be from about 10 seconds to about 30 minutes. The first temperature hold achieves an initial cure of the underfill material 124. Thereafter, a second temperature ramp is accomplished to get the tacky film 130 to release from the flip-chip assembly 110.

The claims therefore refer correctly underfill material and that it is cured between the die and the mounting substrate. Withdrawal of the rejections is respectfully requested.

2. Applicant respectfully disagrees that first heat source and second heat source are not disclosed.

In the specification, it states:

The mold press 232 has a **heater element 238** (depicted schematically). In one embodiment, the **heater element 238** acts to cure a portion of the underfill material 224 that is in contact with the non-tacky film 230. **Figure 4B** depicts the flip-chip assembly 210 after the non-tacky film 230 has been removed, but before a completed cure of the underfill material 224 has been accomplished. A conductive heat transfer process has been carried out between the mold press 232 (Figure 4A) by its heater element 238 (Figure 4A), and the underfill material 224 is partially cured, gelled, and solidified.

After removing the mold press 232 (Figure 4A) and the non-tacky film 230 (Figure 4A), further processing is carried out to cure the bulk of the underfill material 224. Based on the

underfill material and heating approach, there may or may not be a characteristic grain or solidification morphology 240 as depicted in Figure 4B.

In another embodiment, the mold press 232 remains in place during the curing process. In one variant of this embodiment, the mold press 232 acts as the entire heat source for curing. In another variant of this embodiment, the mold press 232 is assisted in the curing process by another heat source such as a curing oven as set forth herein.

In any event, oven curing according to this embodiment entails a two-stage ramp-and-hold process, or a single-ramp process as set forth herein.

The claims therefore refer correctly to two heat sources, and the specification states the mold press can be the entire heat source. Withdrawal of the rejections is respectfully requested.

**Double Patenting Rejection**

Claims 1, 3, 7 and 8 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of U.S. Patent No. 6,703,299.

**A Terminal Disclaimer in compliance with 37 CFR 1.321(b) (IV) is enclosed herewith to obviate this rejection.**

**RESERVATION OF RIGHTS**

In the interest of clarity and brevity, Applicant may not have addressed every assertion made in the Office Action. Applicant's silence regarding any such assertion does not constitute any admission or acquiescence. Applicant reserves all rights not exercised in connection with this response, such as the right to challenge or rebut any tacit or explicit characterization of any reference or of any of the present claims, the right to challenge or rebut any asserted factual or legal basis of any of the rejections, the right to swear behind any cited reference such as provided under 37 C.F.R. § 1.131 or otherwise, or the right to assert co-ownership of any cited reference. Applicant does not admit that any of the cited references or any other references of record are relevant to the present claims, or that they constitute prior art. To the extent that any rejection or assertion is based upon the Examiner's personal knowledge, rather than any objective evidence of record as manifested by a cited prior art reference, Applicant timely objects to such reliance on Official Notice, and reserves all rights to request that the Examiner provide a reference or affidavit in support of such assertion, as required by MPEP § 2144.03. Applicant reserves all

**RESPONSE UNDER 37 CFR § 1.111**

Serial Number: 10/774,869

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Title: UNDERFILL PROCESS FOR FLIP-CHIP DEVICE

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Page 7

Dkt: 884.698US2

rights to pursue any cancelled claims in a subsequent patent application claiming the benefit of priority of the present patent application, and to request rejoinder of any withdrawn claim, as required by MPEP § 821.04.

**CONCLUSION**

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney ((801) 278-9171) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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